

# Utilizing Advanced IT to Support MUDROD to Advance Data Discovery and Access (MUDROD: **M**ining and **U**tilizing **D**ataset **R**elevancy from **O**ceanographic **D**ataset)

A NASA AIST Project (NNX15AM85G)

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NASA Jet Propulsion Laboratory



# Agenda

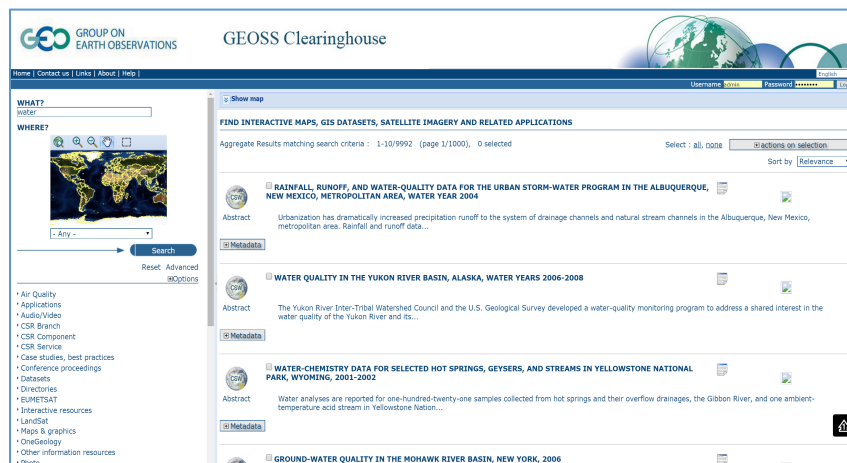
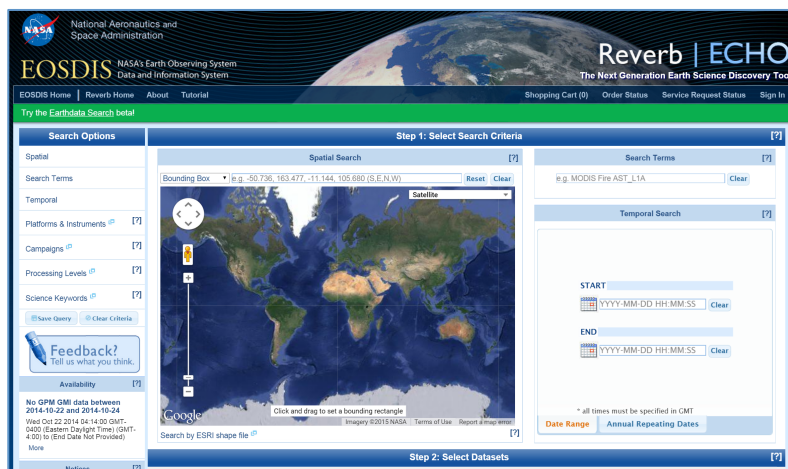
1. Background and Objective
2. Relevant Work
3. Plan for MUDROD
4. Acknowledgements
5. References





# Background

- Dispersed data archive and access



- Search: key-word based matching
- Lack of information to help making data selection
- Visualization





# Objective

1. Share Earth Observation Data for Scientists & Global Challenges, such as Natural Hazards and Emergency Responses
2. Similar User Experience to All End Users
3. As Interactive as Possible
4. Analyzing Data Categorizes
5. Fast (seconds) Responses
6. Accurate Results

## Ranked Results for Data Discover and Access





# Systems Performance Monitoring and Utilization

http://geosearch.cloudapp.net/

File Edit View Favorites Tools Help

GeoSearch

**CISC** Data Discovery  
cisc.gmu.edu

Please input search content here, e.g., "WMS"

Search

Advanced Search

About CISC Help

2:52 PM 10/8/2012



# Vocabularies and Semantics

<http://geosearch.cloudapp.net/>



## Data Discovery

 Please input search content here, e.g., "WMS"

Search

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# Categorization of Searching Results

Browser window showing the URL <http://geosearch.cloudapp.net/> and the title "GeoSearch". The browser menu includes File, Edit, View, Favorites, Tools, and Help.

## Data Discovery cisc.gmu.edu

Search

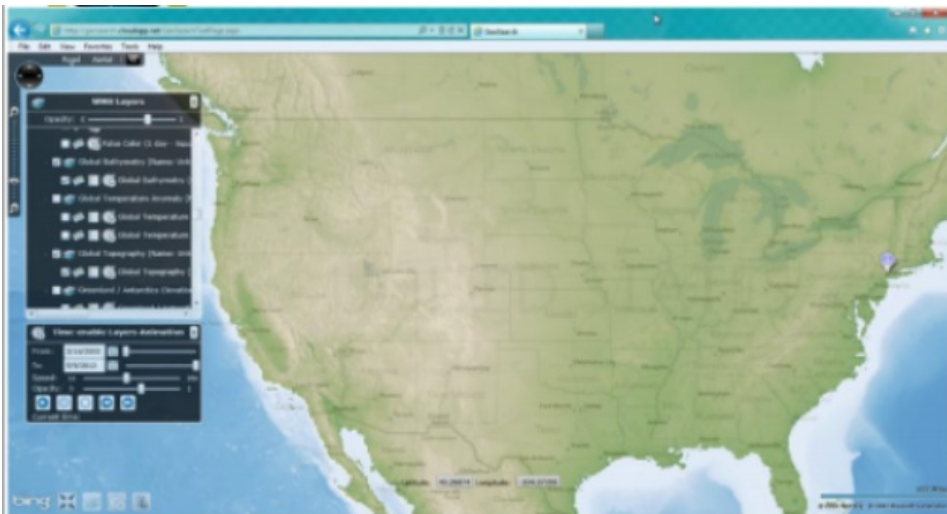
[Advanced Search](#)

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Windows taskbar showing system tray icons for volume, network, and battery (98%), along with the system clock displaying 2:24 PM on 1/22/2012.



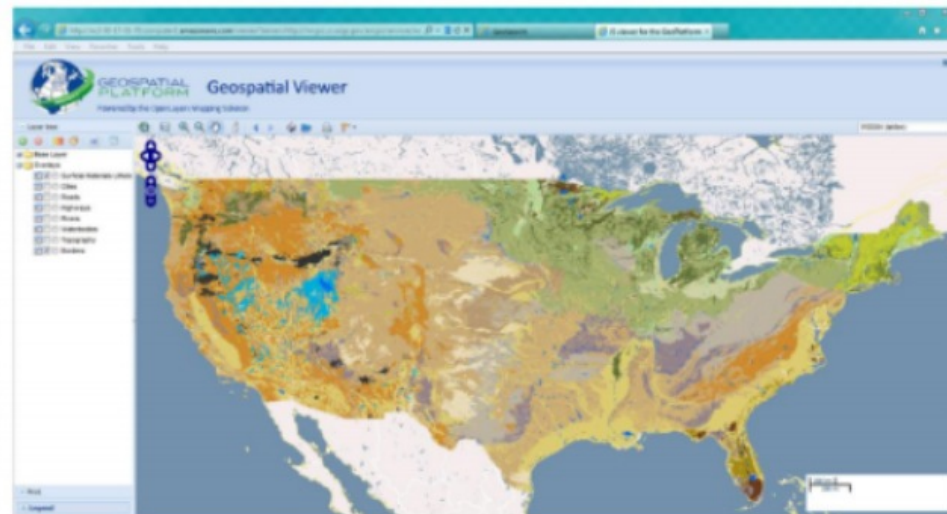
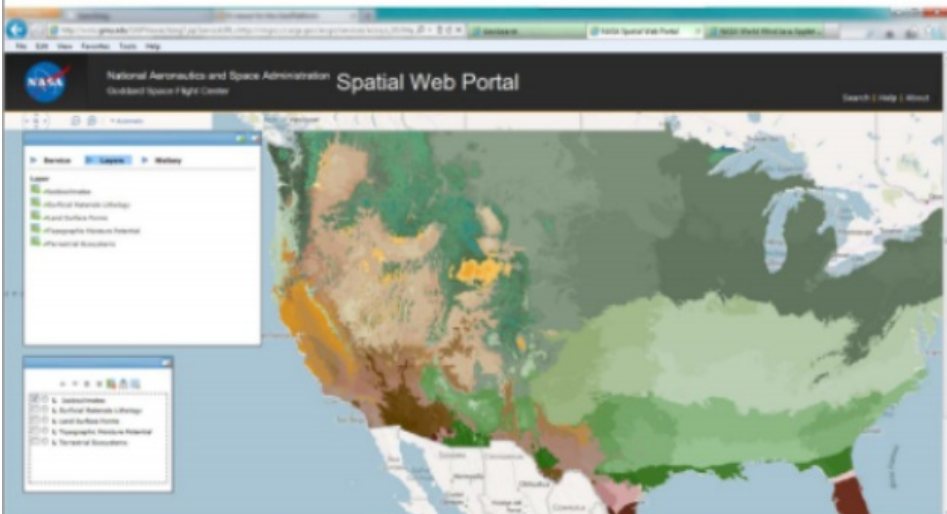
# Adoption of the Technology



(a) Bing Maps (NASA Earth Observations WMS\_Global Bathymetry & Topography\_Visualized)

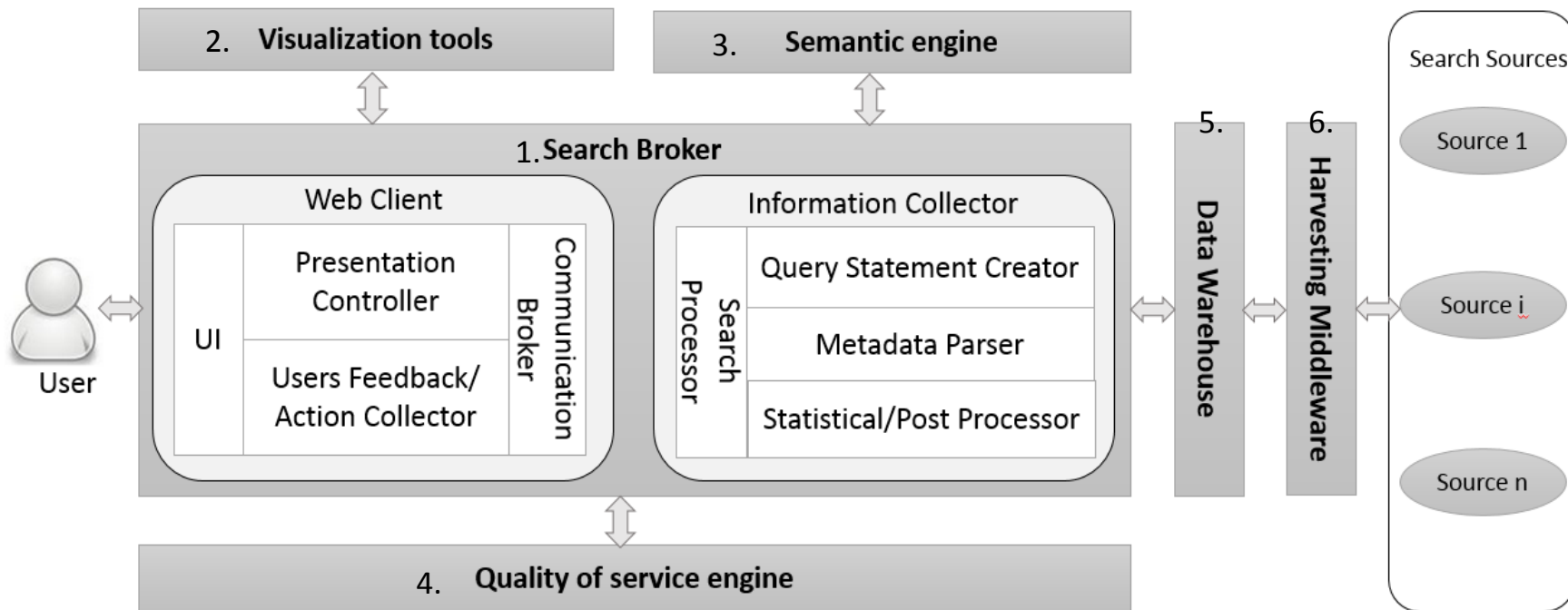


(b) World Wind (CREAF World Map Service\_NOAA AVHRR NDVI 1992-93 May\_Visualized)





# Portal Architecture



## Six Components



# Prototype Demo



## Ocean Resource Discovery

cisc.gmu.edu

 Please input search content here, e.g., "WMS"

Search

[Advanced Search](#)

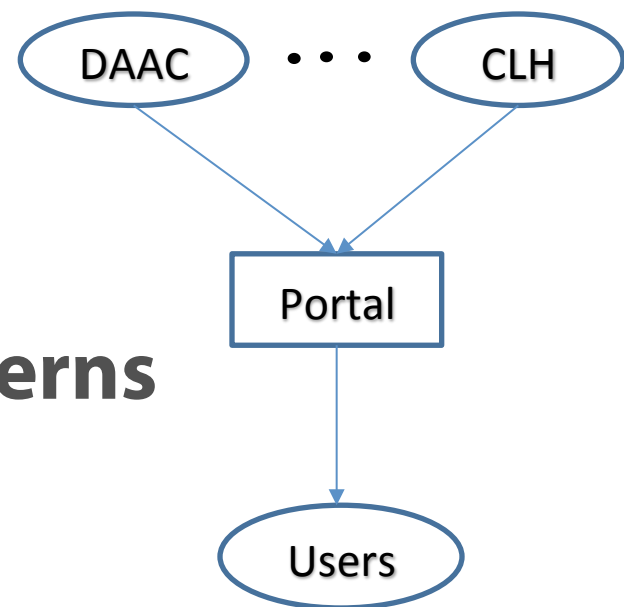
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# MUDROD Focus

- Optimized Ocean Data Discovery
  - Data, Service
  - PO.DAAC, ECHO/CMR, GEOSS Clearinghouse, Data.gov, etc.
- Semantic-based Search
- Service Quality
- **Data and User Profile and Patterns**



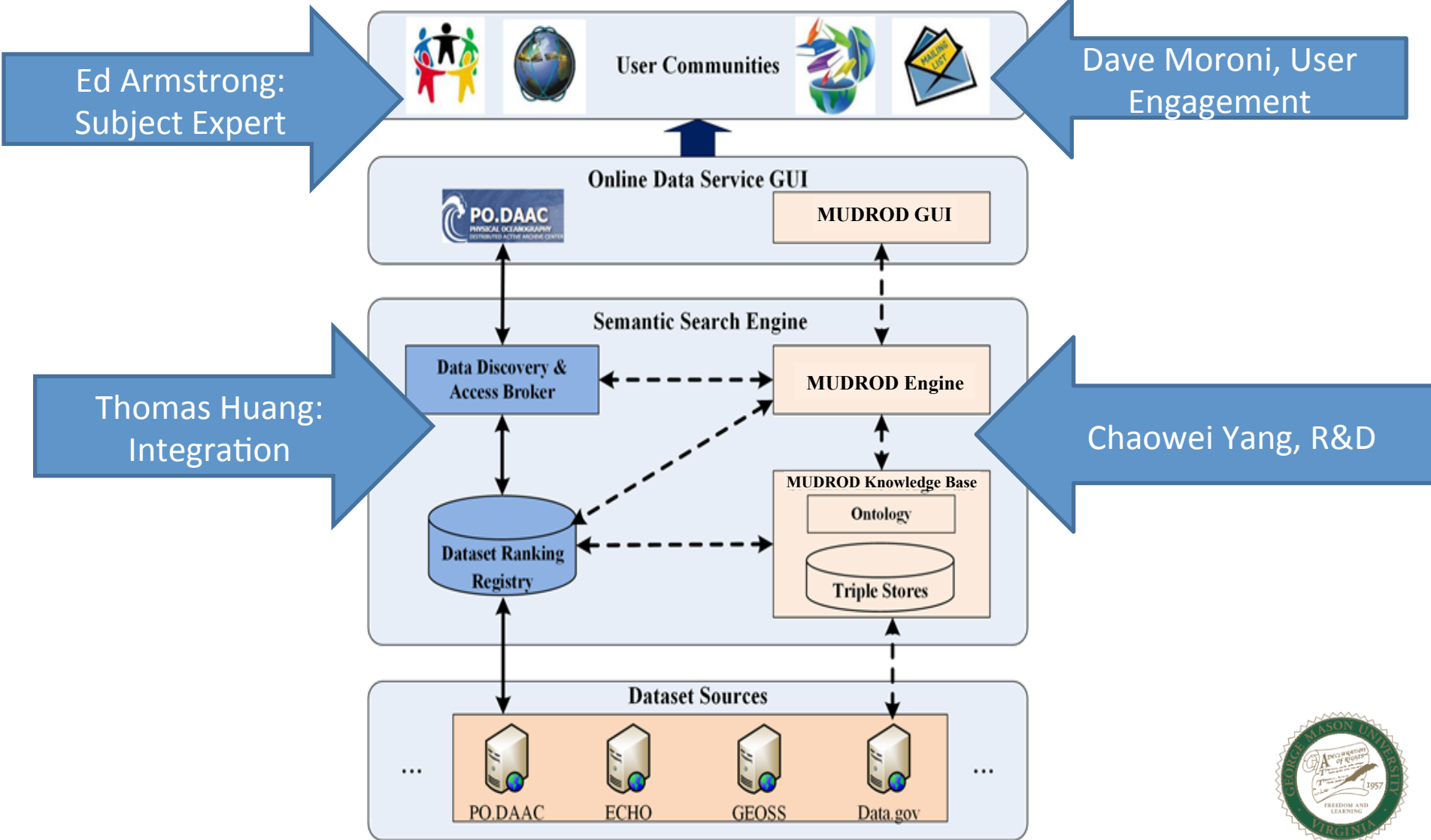


# Sample Data

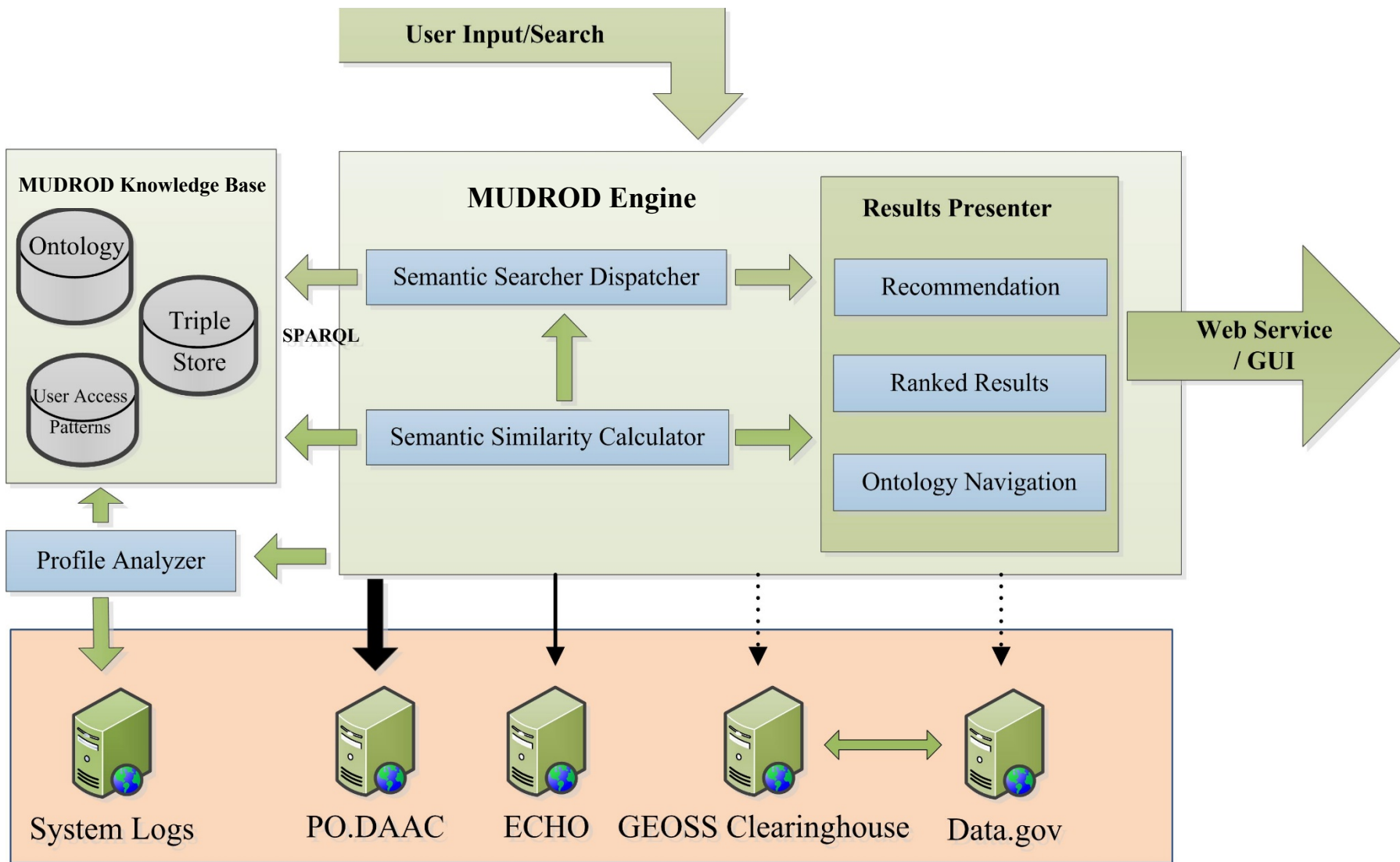
Dataset Family	Example Source(s)	Number of datasets	Parameter(s)	Discipline(s)
Ocean Wind	QuikSCAT, ASCAT, OSCAT	54	OSWV	PO, Met, ASI, Climate, OB
Ocean Radar	QuikSCAT, ASCAT, OSCAT	38	OSWV	PO, Met, ASI, Climate, OB
Ocean Temperature	AVHRR, MODIS, AMSR-E, TMI,	150	SST	PO, Met, ASI, Climate, OB
Ocean Circulation	Multi-Sensor	41	OSC	PO, ASI, Climate, OB
Ocean Salinity	Aquarius	10	SSS, OSW	PO, ASI, Climate
Ocean Topography	T/P, Jason -1, -2, Envisat	46	OST	PO, Met, ASI, Climate, OB
Gravity	Grace	44	G	PO, Climate



# System Architecture



# MUDROD Engine Architecture





# Integration Test/Mature Plan

1. Alpha test integration phase: The current platform and existing capabilities will be analyzed and evaluated to determine the precise requirements for integrating the MUDROD engine with the PO.DAAC data discovery system. A lightweight re-interfacing development will also leverage the AISTCloud with access to a number of catalogs such as EOS ClearingHouse (ECHO) and linked data discovery.
2. Beta test integration phase: The currently deployed data discovery user interfaces at PO.DAAC will be leveraged for beta testing the integrated and alpha-tested MUDROD system by interfacing and integrating the MUDROD knowledge base, GUI, engine, and the current component used in the data service framework.
3. Operation test integration phase: An operational test will be conducted after the beta test phase, and developed intuitive data exploration MUDROD GUI will be integrated with the PO.DAAC data service. Both PO.DAAC (data provider) and user group (data consumer) communities will be invited to evaluate the operations.
4. Operation: The MUDROD system will be integrated into the PO.DAAC operations after functionality and performance adjustment to the MUDROD engine based on user feedback and the linkage to ECHO and CLH will also be connected through previous development for the PO.DAAC users to provide feedback.





# 1<sup>st</sup> Year Phased Progress

Component testing, deployment, PO.DAAC data, PO.DAAC UWG/Scientists

1. Quarter 1: Setup the collaboration and testing environment,
2. Quarter 2: Design MUDROD knowledge base, engine and GUI
3. Quarter 3: Develop PO.DAAC user search and download profile service
4. Quarter 4: Update the semantic search based on the MUDROD system design and conduct alpha development testing.







## 2<sup>nd</sup> Year Phased Progress

ECHO and other DAACs, PO.DAAC UWG/scientists, Open Source consideration

1. Quarter 1: Integrate MUDROD alpha into PO.DAAC Labs and demonstration to PO.DAAC UWG
2. Quarter 2: MUDROD beta testing and enhance knowledge base to include Non-NASA ocean taxonomies, such as those from GCMD
3. Quarter 3: Integrate selected ECHO datasets and ECHO user profile statistics for ECHO integration and conduct operation testing
4. Quarter 4: demonstrate the developed prototype system at PO.DAAC, ECHO, and CLH operations.

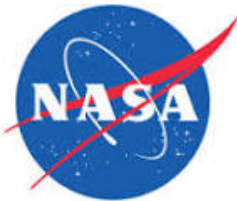




# Acknowledgements

1. NASA AIST Program (NNX15AM85G)
2. SWEET Ontology Team (Initially funded by ESTO)
3. Rahul Ramachandran (providing the earlier version of NOESIS)
4. All team members at JPL and GMU





# References

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